PENNSYLVANIA
TRAIL OF GEOLOGY

SLIPPERY ROCK CREEK GORGE

Forming The Gorge

The striking scenery and deep gorge of Slippery Rock Creek flowing through McConnells Mill State Park (Fig. 1) is attributable to the glaciation of this area which occurred several tens of thousands of years ago and its effects on rocks formed hundreds of millions of years ago.

About 300 million years ago, rivers heavily laden with clay, sand and gravel flowed from highlands in eastern Pennsylvania, New Jersey and Delaware westward across Pennsylvania. Much of the sediment in these rivers was deposited in a series of large deltas covering extensive parts of central and westen Pennsylvania and extending north and south forming a coastline with the shallow seas of the interior lowlands of Ohio, Illinois and the central United States. Extensive swamps formed on these deltas, and the coal deposits presently being mined in the Appalachian basin of northern and western regions of Pennsylvania as well as in West Virginia, Kentucky, Ohio and Alabama (one of the greatest coalfield basins in the world) represent these former coastal swamps. Occasionally the shallow seas would spread eastward, covering the deltas, and deposit marine shales and limestone; the Vanport limestone represents one such incursion of the sea over the nonmarine delta deposits. Figure 2 is a sketch of the sequence of rock units in this area. The valley outline shows how Slippery Rock Creek eroded its channel down through these various rock units. The thick, massive sandstone and conglomerate units rim the high, steep-sided gorge.

The gorge was formed a few tens of thousands of years ago as the results of glaciation. Over the past 40,000 years several large continental ice sheets advanced from Canada and covered much of northwestern Pennsylvania with a thick layer of ice. The southernmost extent of the three such ice advances are delineated in Figure 1. These ice sheets dammed up Muddy Creek and Slippery Rock Creek forming two large glacial lakes. As the ice melted 20,000 years ago, glacial Lake Arthur, much larger than its present day namesake, drained into Slippery Rock valley.

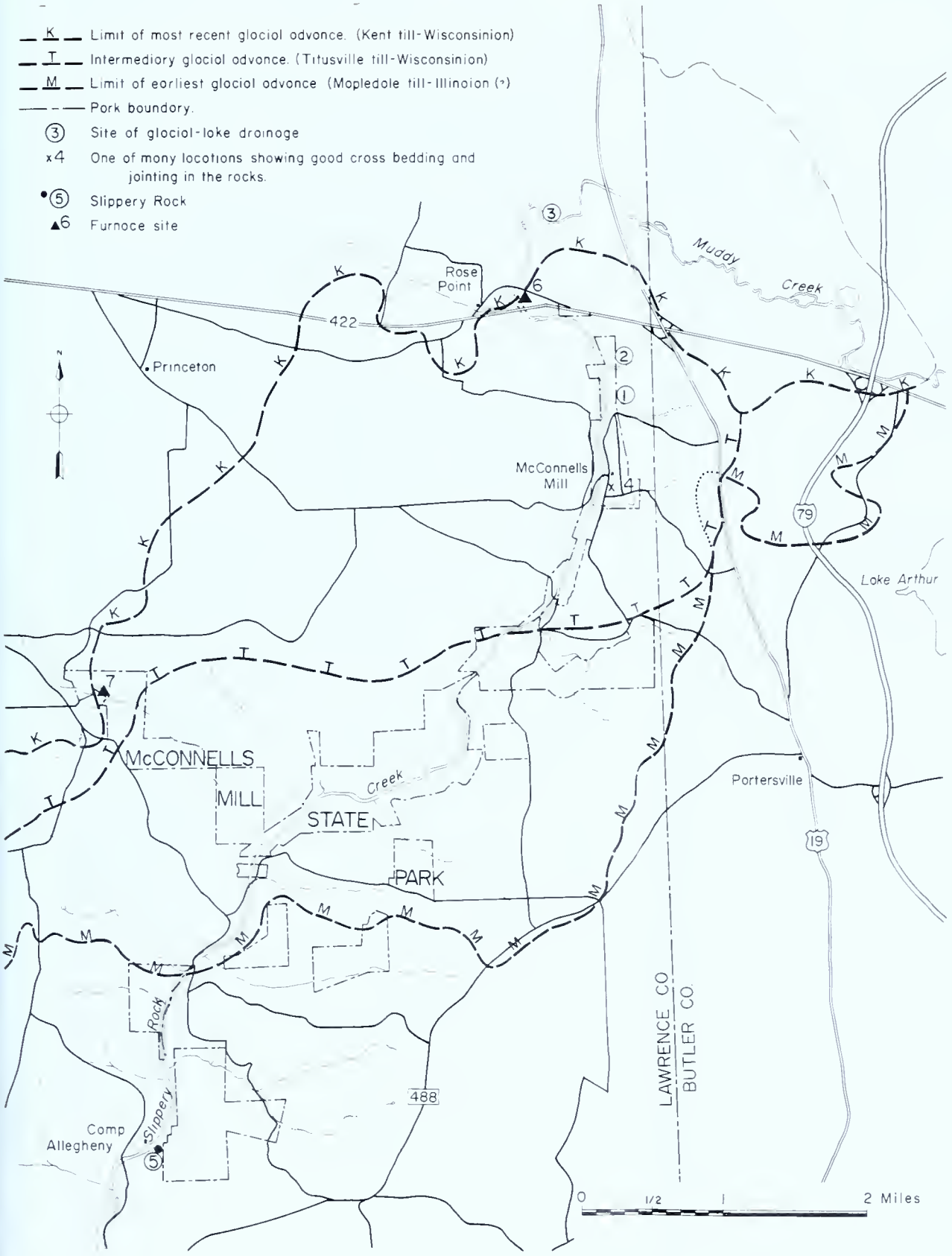

Figure 1

A very large volume of water plunged over the rim of the Homewood sandstone (site 1) with enough energy to quickly enlarge and deepen the gorge well below its present creek level. The valley is actually filled with 20 to 40 feet of glacial and more recently derived rock debris. As the ice retreated further back, more spillways were opened (sites 2, 3) and the gorge was extended northward.

Crossbeds

Many of the outcrops and slump blocks of sandstone and conglomerate contain crossbeds, a feature that gives geologists a clue to the environment of the area 300 million years ago. Crossbeds are minor layers of sediment lying at an angle to the normal horizontal layering. They form when wave and stream currents move loose sand and gravel of a stream bed or sea floor into ripples and underwater dunes.

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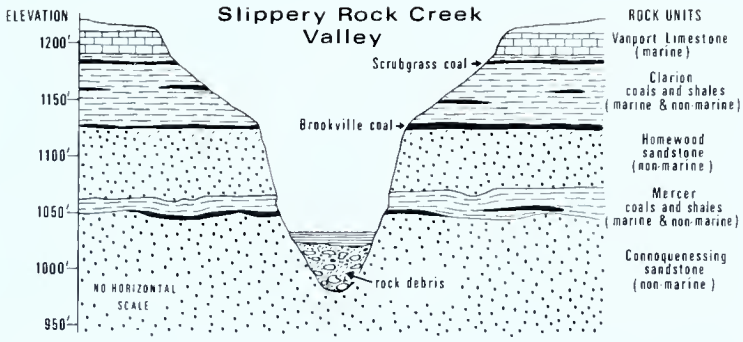


Figure 2

Slump Blocks and Stream Channels

Vertical cracks (joints-seen in figure 3) commonly cut through the thick formations in this area. As Slippery Rock Creek cut downward, the joints opened, and large blocks of sandstone slid and slumped into the stream. A well drilled near the mill revealed that there the stream is flowing on a layer 45 feet thick of glacial, river, and slump debris that chokes and covers the bedrock floor. Water flowing in the stream has carved potholes in the rocks and scoured out tubes through the debris under the channel. The combination of rapids, waterfalls and eddy currents within the channel makes for a very treacherous water course.

Figure 3 Crossbeds in large jointed blocks.

The Slippery Rock

The region around McConnells Mill has been extensively drilled for oil and gas since the finding of oil at Titusville in 1859. Many wells were spudded and drilled right on the banks of the creek. The drilling was initiated by the presence of a natural oil seep from the base of the Homewood Sandstone just below the mouth of Hell Run. The Slippery Rock, which gave its name to the stream, is a slab of sandstone on the east bank of the creek, located opposite Camp Allegheny (site 5). It became slippery apparently from another nearby seep that coated the slab with oil.

Figure 4 **The real Slippery Rock?**

Iron Deposits and Iron Furnaces

The Vanport Limestone that crops out back from the rim, locally has deposits of siderite and limonite at its top. These iron-rich minerals were mined in the mid-nineteenth century and smelted in local charcoal-fired furnaces.

Figure 5 **The Wilroy Iron Furnace.**

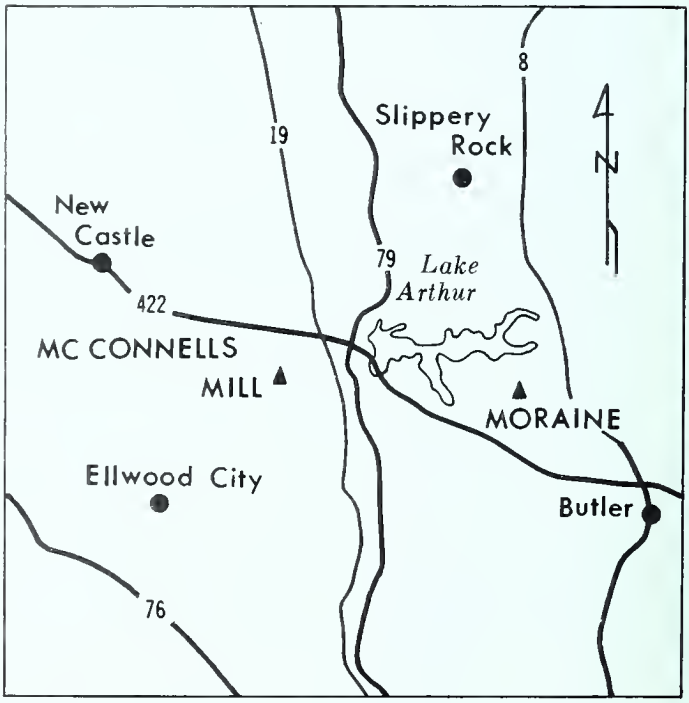
At least three furnaces were constructed along Slippery Rock Creek. Two of these are still viewable. One, the Wilroy Furnace (above) is one of the best preserved in western Pennsylvania and lies just north of the park, on private land, on the east bank of the stream (site 6). This furnace was built in 1854 and produced iron for about 20 years. The other, the Lawrence Furnace, is at the south end of the park, on the south side of Hell Run (site 7). This furnace was constructed about 1846 against and in a cliff to take advantage of natural ramp for charging the furnace.

Kent Bushnell, Geologist
Slippery Rock State College

Other interesting glacial features may be observed in nearby Moraine State Park (see Park Guide 4).

VISITING HOURS

8:00 A.M. to Sundown
Year Around



COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES

Prepared by

BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY